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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/525,689	08/24/2005	Bruce F. Monzyk	BATZ 2 00001-3(II)-3 US	7655

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EXAMINER	
DINH, BACH T	

ART UNIT	PAPER NUMBER
1795	

MAIL DATE	DELIVERY MODE
07/09/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/525,689	MONZYK ET AL.	
	Examiner	Art Unit	
	BACH T. DINH	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 April 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-44* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *16-32 and 35-38* is/are allowed.

6)☒ Claim(s) *1-15,33 and 39-44* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Summary

1. This is the Office Action in response to the Amendments filed on 04/25/2008.

2. Claims 1-33 and 35-44 remain pending in the application.

Response to Amendment

Claim Rejections - 35 USC § 102 and § 103

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. Claims 1-15, 33 and 39-44 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Gratzel (WO 01/02624).

Addressing claim 1, Gratzel discloses a photolytic apparatus (figure 1) for oxygenating and removing carbon dioxide from a confined volume (this is directed to the intended use of the photolytic apparatus) comprising:

A photolytic cell having an anode compartment containing a transparent window or waveguide (glass window 1), an anode (layers 3 and 4) and an anolyte flowpath (electrolyte compartment 2, electrolyte is introduced as well as extracted from the compartment, thereby, constitutes the flowpath), wherein the anode comprises a conductor layer (second conducting oxide film 4 adjacent to layer 6) and a photo-reactive surface (semiconductor film 3) having the ability to convert water to oxygen (this is directed to the intended use of the reactive surface); and a cathode compartment (electrolyte compartment 9) with a cathode (cathode 10) having the ability to convert carbon dioxide, electrons, and hydrogen ions into a solid or liquid medium (this is directed to the intended use of the cathode); and

A light source (figure 1, solar light source, 2:29-30) for providing light photons to the photolytic cell and activating the photo-reactive surface (this is directed to the intended use of the light source);

Wherein the transparent window or waveguide (glass window 1) is between the light source (solar light source) and the conductor layer (second conducting oxide film 4 adjacent to layer 6); and the photo-reactive surface (semiconductor film 3) is between the

conductor layer (conducting oxide film 4) and the anolyte path (electrolyte compartment 2, see figure 1).

With regard to the limitations that are indicated as intended use above, it is noted that "apparatus claims cover what a device is, not what a device does", *Hewlett-Packard Co. v. Bausch & Lomb Inc.,* 15 USPQ 2d 1525. The subject matter as a whole would have been obvious to one having ordinary skill in the art at the time of the invention to have modified Gratzel's disclosure because it has been held on the intended use of a device.

Addressing claims 2-3, Gratzel discloses the photo-reactive surface comprises a light-activated catalyst of metal oxide catalyst comprising TiO_2, and WO_3 (2:24-3:6).

Addressing claims 4 and 41-42, Gratzel discloses the light source is solar spectrum (2:29-30); therefore, the solar light source includes the claimed ultraviolet light at 350-500 nm and visible light. It has been held that the disclosure in the prior art of any value within the claimed range is an anticipation of that range. And a prima facie case of obviousness exists in the case where the claimed range overlaps range disclosed by the prior art, *In re Wertheim* 191 USPQ 90.

Addressing claims 5-7, 10-12, 14, 33 and 39-40 where the confined volume is not claimed as part of the structure of the claimed device and claims 8-9 where the recited disproportional catalyst is not claimed as part of the structure of the claimed device, the

manner and method in which such device is to be utilized is not germane to the issue of patentability of the device itself.

Addressing claim 13, Gratzel discloses the photo-reactive surface comprises a light transparent substrate (first transparent conducting film 4 left of layer 1) and a photolytic coating (semiconductor layer 3, see figure 1).

Addressing claim 15, Gratzel discloses the photolytic coating further comprises a disproportionation catalyst (Fe_2O_3, 2:24-26).

Addressing claim 43, Gratzel discloses the cathode is electrically connected to the anode (figure 1, electrical connection 5).

Addressing claim 44, Gratzel discloses a photolytic apparatus (figure 1) for oxygenating and removing carbon dioxide from a confined volume (this limitation is directed to the intended use of the photolytic apparatus) comprising:

A photolytic cell having an anode compartment containing a transparent window or waveguide (glass sheet 1) and an anode (layers 4, 6, 7 and 8), the anode comprising a conductor layer (conducting oxide film 4) and a photo-reactive surface (dye-derivatized nanocrystalline titania film 6) having the ability to convert water to oxygen (this limitation is directed to the intended use of the photo-reactive surface); and a cathode compartment (electrolyte compartment 9) with a cathode (cathode 10) having the ability

to convert carbon dioxide, electrons, and hydrogen ions to a solid or liquid medium (this limitation is directed to the intended use of the photolytic apparatus), the cathode being electrically connected to the anode (electrical connection 5); and

A light source (solar light source, 2:29-30) for providing light photons to the photolytic cell and activating the photo-reactive surface (this limitation is directed to the intended use of the light source);

Wherein the transparent window or waveguide (glass sheet 1) is directly connected to the conductor layer (glass sheet 1 is directly connected to conducting oxide film 4, 3:3-4) and the light source is located so that the light photons travel through the transparent window or waveguide and the conductor layer prior to reaching the photo-reactive surface (see figure 1, 2:24-3:8).

Response to Arguments

7. Applicant's arguments with respect to claims 1-15, 33 and 39-44 have been considered but are moot in view of the new ground(s) of rejection.

Allowable Subject Matter

8. Claims 16-32 and 35-38 are allowed.

9. The following is an examiner's statement for reasons for allowance:

Addressing claim 19, Ayers (US 4,466,869) discloses a photolytic device (figure 1), comprising:

A photolytic cell having an anode compartment (photoelectrode 5) and a cathode compartment (counter electrode 51),

a. the anode compartment having an inlet, an outlet (means for feeding and extracting the electrolyte, 8:38-46), an anode conductor (electroconductive layer 9) and a photo-reactive surface (electrocatalytic layer 7); and

b. the cathode compartment having an inlet, an outlet (means for feeding and extracting the electrolyte, 5:9-14, 8:38-46), and a cathode conductor (counter electrode 51), wherein the cathode conductor is connected to the anode conductor (the cathode conductor 51 and anode conductor 9 are connected as seen in figure 1); and

A light source (light source 61);

Ayers further discloses extracting the depleted electrolyte along with the generated O_2, hydrogen or the anodic co-product and the extracted electrolyte is fortified before being subjected to further photolysis (8:30-60).

Ayers does not disclose nor render obvious:

An O_2 gas separator having an inlet, a gas outlet, and a liquid outlet;

A gas/liquid contactor having a gas inlet, a liquid inlet, and an outlet:

A carbon source; and

A liquid/solid separator:

Wherein the O_2 gas separator inlet is connected to the anode compartment outlet, the O_2 gas separator liquid outlet is connected to the anode compartment inlet and the O_2 gas separator gas outlet is connected to an associated gas source;

The liquid inlet of the gas/liquid contactor is connected to the carbon source, the gas inlet of the gas/liquid contactor is connected to the associated gas source, and the outlet of the gas/liquid contactor is connected to the cathode compartment inlet; and

The cathode compartment outlet is connected to the liquid/solid separator.

Addressing claim 19, Gonzalez-Martin et al. (US 5,779,912) discloses a photocatalytic reactor comprises of photo-reactive surface of TiO_2. However, Gonzalez-Martin fails to disclose the required structure limitations as recited in present claim.

Claims 16-18, 20-32 and 35-37 are allowed as dependents of claim 19.

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to BACH T. DINH whose telephone number is (571)270-5118. The examiner can normally be reached on Monday-Friday EST 7:00 A.M-3:30 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X. Nguyen can be reached on (571)272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

BD
07/03/2008

/PATRICK RYAN/
Supervisory Patent Examiner, Art Unit 1795